**Ecosystems and Communities Unit Plan**

**Textbook Concept list**

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| --- | --- | --- | --- |
| Concept | Definitely Include? | Maybe Include? | Don’t Include? |
| Greenhouse effect | X |  |  |
| Climate | X |  |  |
| Heat transport in Biosphere | X |  |  |
| Biotic and Abiotic factors | X |  |  |
| Organism interactions within ecosystems | X |  |  |
| Succession | X |  |  |
| Major Biomes of Earth | X |  |  |
| Fresh Water Ecosystems | X |  |  |
| Marine Ecosystems | X |  |  |

**Illinois Learning Standards Concept List**

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| --- | --- | --- | --- | --- |
| Concept | Descriptor | Definitely Include? | Maybe Include? | Don’t Include? |
| Greenhouse effect | ILS Stage H 12E 2 | X |  |  |
| Climate | ILS Stage H 12 E 2 | X |  |  |
| Heat transport in Biosphere | ILS Stage H 12 E 2 | X |  |  |
| Biotic and Abiotic factors | ILS Stage I 12 B 1 | X |  |  |
| Organism interactions within ecosystems | ILS Stages I and H 12 B 1 | X |  |  |
| Succession | ILS Stage H 12 B 4 | X |  |  |
| Major Biomes of Earth | ILS Stage I 12 B 3 | X |  |  |
| Fresh water ecosystems | ILS Stage I 12 B 3 | X |  |  |
| Marine ecosystems | ILS Stage I 12 B 3 | X |  |  |

**Concepts to be taught:**

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| --- | --- | --- | --- | --- | --- |
| Concept | This Unit? | Another Unit? | Leave Out? | Rationale | Related ILS |
| Greenhouse effect | X |  |  | This concept has become important to discuss due to its effects and possible alterations on ecosystems. | ILS Stage H 12E 2 |
| Climate | X |  |  | This topic forms some of the basic abiotic factors that influence ecosystems and biomes. | ILS Stage H 12E 2 |
| Heat transport in Biosphere | X |  |  | This concept is a key to helping students understand how ocean currents and wind conditions help shape biomes and the ecosystems within them. | ILS Stage H 12 E 2 |
| Biotic and Abiotic factors | X |  |  | Biotic and Abiotic factors are what fundamentally shape an ecosystem and are important for students to understand how their interactions affect one another. | ILS Stage I 12 B 1 |
| Organism interactions within ecosystems | X |  |  | This concept is essential to students understanding how individual organisms play a role with one another and their environment. | ILS Stages I and H 12 B 1 |
| Succession | X |  |  | Succession comes into play when discussing the stability of an ecosystem. By teaching this concept, the goal is to help students understand that ecosystems are shaped by the order that organisms that colonize them. | ILS Stage H 12 B 4 |
| Major Earth Biomes | X |  |  | These major biomes are the basis for ecosystems. They supply students with basic information on things such as resource availability and conditions that organisms will experience within an ecosystem located in each biome. | ILS Stage I 12 B 3 |
| Fresh-Water Ecosystems | X |  |  | Aquatic ecosystems have been in existence for a much larger amount of time than land based ecosystems. These systems are also diverse in life and impact land ecosystems. | ILS Stage I 12 B 3 |
| Marine Ecosystems | X |  |  | Marine ecosystems contain the largest amount of water on the planet’s surface. Within these waters the diversity of life is massive and the organisms within these ecosystems play a large role within food supplies for various populations around the world. | ILS Stage I 12 B 3 |

**Teaching Objectives:**

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| --- | --- |
| Concept | Objective(s): The student will be able to… |
| 1. Climate | a. Describe the three climate zones of Earth  b. Explain how latitude affects climate  c. Differentiate between weather and climate |
| 2. Heat transfer within the biosphere | a. Analyze ocean current and global wind maps |
| 3. Greenhouse effect | a. Define the Greenhouse effect |
| 4. Biotic and Abiotic factors | a. Distinguish between biotic and abiotic factors of a given ecosystem  b. Predict the effect of changing abiotic factors will have on the biotic factors within an ecosystem |
| 5. Succession | a. Differentiate between primary and secondary succession  b. Define pioneer species and their role in succession |
| 6. Organism interactions within ecosystems | a. Distinguish between a niche and a habitat  b. Identify 3 common types of organism interactions than can be found in any ecosystem |
| 7. Major biomes | a. Identify all major biomes and give at least two characteristics of each.  b. Create an informational poster about a biome. |
| 8. Fresh water ecosystems | a. Define flowing water, standing water, wetland and estuary ecosystems |
| 9. Marine ecosystems | a. Label a model of the different zones located within a marine ecosystem |

**Teaching strategies for objectives:**

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| --- | --- | --- | --- |
| Objective | Possible Teaching Strategies | Final Choice | Rationale |
| 1a. Describe the three climate zones of Earth | -lecture with power point  -group worksheets | -Lecture with power point | This concept can be covered quickly in a basic introductory power point for the unit. |
| 1b. Explain how latitude affects climate | -lecture with power point  -model using a globe and flashlight | - both lecture and modeling with a globe | While the lecture can discuss and explain the reasoning, students will be able to visualize this concept by modeling with a globe and flashlight. |
| 1c. Differentiate between weather and climate | -lecture  -class discussion and worksheet  -van diagram | -class discussion and worksheet | This gets students to show their current understanding of weather and climate and allows for quick recognition of student misconceptions. |
| 2a. Analyze ocean current and global wind maps | -class discussion sample map images  -video | -Worksheets and sample map images | In order for the students to be literate with scientific maps, it would be beneficial for them to view sample maps and create their own and understand what the maps illustrate. |
| 3a. Define the Greenhouse effect | -lecture  -class discussion | -lecture | Students will be presented with information on the factors involved in the greenhouse effect as well as develop an understanding of the process. |
| 4a. Distinguish between biotic and abiotic factors of a given ecosystem | -lecture with power point  -class discussion | -both a lecture and class discussion | Lecturing will help to introduce the students to biotic and abiotic factors and a discussion will help them separate the two. |
| 4b. Predict the effect of changing abiotic factors will have on the biotic factors within an ecosystem | -scenario based worksheets  -class discussion  -lab experiment | -scenario based worksheets and lab experiment | By creating scenarios, I can manipulate what abiotic factors are changed and students will answer how the biotic factors will respond. Students will also complete a lab to demonstrate the impact of changing an abiotic factor. |
| 5a. Differentiate between primary and secondary succession | -lecture  -field experiment | -lecture | While a field experiment would be extremely engaging, local areas of possible succession and time restraints might not allow for it. |
| 5b. Define pioneer species and their role in succession | -lecture  -video | -lecture | -concept can be taught through lecture. |
| 6a. Distinguish between a niche and a habitat | -lecture  -Class discussion | -class discussion | This will get students engaged and allow me spot misconceptions. |
| 6b. Identify 3 common types of organism interactions than can be found in any ecosystem | -video  -have students play a game | -have students play a game | Students would assume the roles of organisms and “experience” mutualism/predation etc. Also a good tie in with niche and habitat. |
| 7a. Identify all major biomes and give at least two characteristics of each. | -research  -lecture | -both | -The lecture provides an introduction into the research project for the students. |
| 7b. Create an informational poster about a biome. | -lecture  -research project | -research project | Students will be responsible for researching a specific biome and creating a poster as a unit project. |
| 8a. Define flowing water, standing water, wetland and estuary ecosystems | -lecture  -video  -class discussion | -lecture with a class discussion | The lecture portion will present them with information that they can use in the discussion to help define each ecosystem. |
| 9a. Label a model of the different zones located within a marine ecosystem | -lecture with image of zone map | -lecture with image of zone map | This concept is mostly a visual one. Students will need to see where each zone transitions into the next. |

**Assessment Strategies:**

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| Objective | Possible Assessment Strategies | Final Choice | Rationale |
| 1a. Describe the three climate zones of Earth | -climate worksheet  packet  -oral quiz | -climate worksheet  packet | -quickly graded and returned for students to study unit exam. |
| 1b. Explain how latitude affects climate | -weekly quiz  -climate worksheet packet | -both | -worksheet will help them study for quiz. Quiz will allow for clarification before exam. |
| 1c. Differentiate between weather and climate | -participation in class discussion  -climate worksheet packet | -both | -Get students engage in class discussion. |
| 2a. Analyze ocean current and global wind maps | -interpretation of sample maps  -students construct their own map | -interpretation of sample maps | -Allows for me to see if students can understand maps. |
| 3a. Define the Greenhouse effect | -weekly quiz  -climate worksheet packet | -both | - Worksheet can provide additional information than I may get to in lecture. |
| 4a. Distinguish between biotic and abiotic factors of a given ecosystem | -Venn Diagram  -Short answer question on unit exam | -Venn Diagram | -Can then be used as a student study tool. |
| 4b. Predict the effect of changing abiotic factors will have on the biotic factors within an ecosystem | -Laboratory report  -scenario worksheet | -Laboratory report | -Scenario worksheets would not be graded; lab reports would be for their chosen experiment. |
| 5a. Differentiate between primary and secondary succession | -Think Pair share  -succession worksheet | -both | -students should be able to explain this concept in their own words. |
| 5b. Define pioneer species and their role in succession | -succession worksheet | -succession worksheet | -Concept can be assessed on a worksheet. |
| 6a. Distinguish between a niche and a habitat | -worksheet  -Venn Diagram | -Venn Diagram | -Provides contrast and comparison for students to study for exam. |
| 6b. Identify 3 common types of organism interactions than can be found in any ecosystem | -worksheet to go along with game  -Essay | -worksheet to go along with game | -Gives a more in-depth aspect to the game students will pay. |
| 7a. Identify all major biomes and give at least two characteristics of each. | -fill in map of the globe with appropriate biome locations  -KWL slip | -fill in map  -KWL Slip | -Students will recognize areas where each biome can be found. |
| 7b. Create an informational poster about a biome. | -research poster project | -research poster project | -Provides that students actually researched and met specific criteria on their chosen biome. |
| 8a. Define flowing water, standing water, wetland and estuary ecosystems | -Aquatic ecosystem packet  -Matching terms worksheet | -Aquatic ecosystem packet | Provides students chance to discuss in groups if they choose to. Also provides them with a study tool. |
| 9a. Label a model of the different zones located within a marine ecosystem | -shoe box diorama  -fill in the blank picture worksheet | -fill in the blank picture worksheet | -Students can visualize and identify the different marine zones |

**Laboratory Skills:**

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| Science Laboratory Skill | Related Objective(s)? | Teaching Strategy? |
| -Graph and map creation  -graph interpretation | 1a. Describe the three climate zones of Earth  2a. Analyze ocean current and global wind maps | -lecture and class discussion |
| -observations | 4b. Predict the effect of changing abiotic factors will have on the biotic factors within an ecosystem | -plant growth lab |
| -Design and complete an experiment. | 4b. Predict the effect of changing abiotic factors will have on the biotic factors within an ecosystem | -plant growth lab |

**Unit Plan Overview**

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| **Day** | **Objective** | **Teaching Strategy** | **Assessment Strategy** | **Notes** |
| 1 | 1a. 1b. 1c. | Lecture, class discussion and modeling | climate worksheet packet | Announce quiz for end of week  Bring globe and flashlight for climate model |
| 2 | 2a. 3a. | Class discussion and group work | Greenhouse effect worksheet and heat distribution maps | Bring worksheets and maps |
| 3 | 4a. | Lecture and discussion | Venn diagram worksheet | Inform students about lab for following class period |
| 4 | 4b. | Laboratory experiment | Lab report (to be collected day 9) | Bring soil types, transport plants for students to place in soil types |
| 5 | 1a. 1b. 1c., 2a., 3a., 4a. | Laboratory experiment observations, brief review | quiz |  |
| 6 | 5a. 5b. | lecture, Think Pair Share groups | Succession worksheets | Give students a heads up on upcoming research project |

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| --- | --- | --- | --- | --- |
| **Day** | **Objective** | **Teaching Strategy** | **Assessment Strategy** | **Notes** |
| 7 | 6a. 6b. | Lecture, game | worksheets | Bring game boards and cards  Pass out review objectives for students |
| 8 | 7a. | Lecture | KWL slip and biome map | KWL slip can be used by students to decide on their biome for the research project. |
| 9 | 7b. | Library Research Day | Check on student progress of project | Reserve computers/library space  Collect Lab reports |
| 10 | 8a. 9a. | Lecture, group work on aquatic ecosystems packet | Packet, marine level diagram worksheet | Packet will be given points for completion, gone over during review |
| 11 | All objectives | Review day | Participation in review game and discussion | Collect Biome projects |
| 12 | All objectives | Unit Exam day | Unit exam | Place copies of exam in make-up center for absent students. |

**Units before and after ecosystem and communities:**

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| Units Preceding This One | Reasoning | Unit Following This One | Reasoning |
| Biosphere | Some information about climate and weather may be covered in this unit and that can be brought into the ecosystem unit and expanded on such as climate. | Population Ecology | By having already introduced students into the basics of ecosystems and the concepts of predation, competition, and niches, students would benefit from taking these concepts further and branching into concepts such as growing and declining populations. |